

## THE CORNICE, SKYLIGHT & ROOFING

Of The McAlpin Hotel (F. M. Andrews & Co., Architects)

consisting of  
500,000 sq. feet Slag roofing.  
30,000 " Promenade tile  
8,000 " Spanish tile for roof gardens.  
2,100 " Skylight copper with wire glass.  
20,000 lbs. Copper in roof construction.

### The Woolworth Building (Cass Gilbert, Architect)

Copper Pans for all Terra Cotta sill joints.

Industrial School, Reynold Island.  
Calcott Building, 118-120 W. 22d St. Wm. H. Gombert, Architect.  
Stern Brothers Building, West 23d St. Maynicke & Franke, Architects.  
Globe Theatre, Carnegie & Hastings, Architects.  
Studio Building, East 23d St. McKim, Mead & White, Architects.  
Osborne Hall, 26 East 26th St. Parish & Schroeder, Architects.  
Bergen County Court House and Jail James Riley Gordon, Architect.  
Bigelow & Kennard Building, Boston Henry Ives Cobb, Architect.

All Executed in the most scientific manner as only  
**CORNICE, SKYLIGHT AND ROOFING**  
should be done.

**W. L. WEISS**

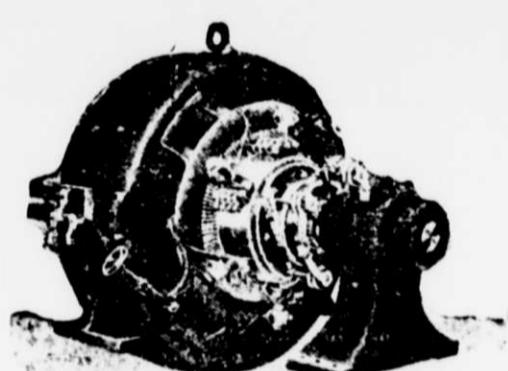
Works: No. 406-8 East 25th Street  
New York City

## Air Washing

How many persons know that Air can be and is washed, dried and delivered pure as a sea breeze through the ventilating system of the building?

The "ACME" Air Washer, manufactured by Thomas & Smith, 416 Broadway, accomplishes the above results, and is now installed in the following buildings recently erected in this city:

Wanamaker Store	Whitehall Building
McCreary Store	Nemo Building
Gimbels Bros.	Coague Office Building
Stern Bros.	Importers & Traders Bank
N. Y. Central Office Building	Kuhn-Loech Co's Bank
and Station	City Investing Building
Ritz-Carlton Hotel	New York Law School
Vanderbilt Hotel	Folies Bergères Theatre
Rector Hotel	New York Post Office
Fifth Avenue Building	Cable Building
Eighty Maiden Lane Building	Prudential Life Building



## More Than 150 Sprague Electric Motors

WILL BE INSTALLED IN

THE MUNICIPAL BUILDING

THE McALPINE HOTEL

and THE 80 MAIDEN LANE BUILDING

### The Adaptability of Sprague Electric Motors

FOR ALL CLASSES OF SERVICE IS SHOWN BY THE VARIETY OF MACHINES  
TO WHICH THEY ARE APPLIED IN THESE BUILDINGS

The List of Motor Applications Includes

Ventilating Fans  
Refrigerating Machines  
Laundry Machines

Pumps  
Vacuum Cleaners  
Machine Tools  
Pneumatic Carrier Systems

Air Compressors  
Printing Presses  
Kitchen Equipments

THE SPRAGUE ELECTRIC WORKS HAS SPECIALIZED FOR MANY YEARS IN THE EQUIPMENT OF BUILDINGS WITH MOTORS, SWITCHBOARDS AND GENERATORS FOR LIGHT AND POWER

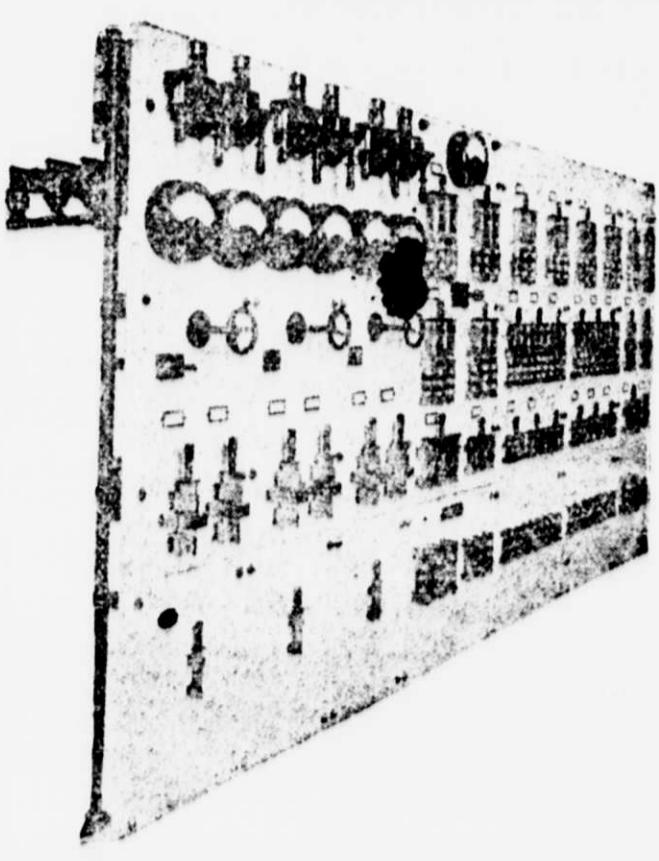
## SPRAGUE ELECTRIC WORKS OF GENERAL ELECTRIC COMPANY

Generators  
Motors  
Switchboards  
Controllers  
Electric Dynamometers  
Electric Freight Hand-  
Ling Machinery

Electric Hoists  
Electric Fans  
Armored Cable  
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PRINCIPAL CITIES



## TRANSPORTATION SKYWARD AND BACK

Improvements in Elevators for the Safety and Convenience of Passengers.

### MEETING A MODERN NEED

Usefulness of Towering Buildings Depends on Means of Up and Down Transit.

What would be the use of a high building if you had to walk to the upper floors? Of the hundreds of thousands of men and women who swarm in and out of the big downtown buildings in New York one might count on his fingers those who pause a minute to consider the delicate and costly equipment which has made the thirtieth floor only a minute away from the street. Passengers step into the elevators and are whisked skyward at the rate of 600 feet a minute. Each elevator runner travels at least twenty miles a day, it is estimated, in a busy building of many stories.

How old an invention the elevator really is nobody knows. A man who has made a lifelong study of the subject gave it as his belief that it goes back to old Egyptian days, for, he stated, antiquaries have discovered a rude hydraulic elevator that dates from 500 B.C. This elevator was a mere log of wood, forced by water power through a rough stuffing box, and from its location might have been used to lift persons or heavy articles. Everybody remembers the unwieldy contraption in which one had to haul himself, or be hauled, up a story or two, hand over hand, by a sticky hempen rope which went over a wheel at the top.

Another device of about the same kind was the old steam elevator still much in favor in country mills, in this style. A belt is shifted to a pulley connected with a drum and the elevator jerked up to the noisy accompaniment of a wheezing engine and areaking belt. One always wondered what would happen if the belt should slip. The belt sometimes did slip and the local newspaper told the story. Chroniclers of this line of mechanics give the date of the first important progress as 1850, when an elevator was constructed to work by the motion of a vertical screw. It was the nut on which carried the cage. This device was used during the next twenty years and gave

place to the hydraulic lift, the simplest thing so far in elevators. This usually consisted of a long pipe set deeply in the ground under the cage and in the pipe a plunger which rose and fell as required, and carried the cage with it. Such elevators are still common, but require a well underneath the building as deep as the elevator is to go high.

"This is a good type of elevator," said an expert, "but when something happens a couple of hundred feet underground it isn't the easiest thing in the world to get at the cause of the trouble." The length of plungers, too, is limited.

Now the elevator people are harking back to a new application of the old hand-hauling device. The newest form of elevator will go up as high as any building can be constructed, and needs no excavation. The device looks like a clock weight. A long cable suspended over a pulley and weighted at one end with the elevator and at the other with a load of lead. It is driven from the top. This elevator is explained in this way by the company which puts it out.

The invention of the direct drive and consequent elimination of all intermediate gearing between the motor and driving member results in a machine of remarkably high efficiency, and the use of a high speed motor together with the carefully designed controller, gives starting, slowing, retarding and stopping effects unequalled to even the most costly, high-grade, hydraulic equipments.

The driving cables, from one end of which is supported the car, and at the other end, the counterweight, pass partially around a pulley, then through sheave in lieu of a drum containing an idler leading sheave, thereby forming a complete loop around these two sheaves, this arrangement resulting in the necessary tractive effort for lifting the car.

In designing the controlling equipment one of the factors of the greatest consideration in view of the very high speed at which the cars run is the automatic retarding of their speed and the final positive stopping of same, automatically, at the upper and lower terminals of travel. This result is very satisfactorily attained with the installation of the elevator hardware of two groups of switches located respectively at the top and bottom of the shaft, each switch in the series being opened one after another, as the car passes, resulting in a reduction of speed until the opening of the final switch brings the car to a positive stop applying the brakes. This operation is entirely independent of the operator in the car and is effective even though the car operating device be left in the full speed position.

Another feature of security of the greatest interest and importance is provided by the buffers. These are placed in the hoistway walls under the car and one under the counterweight. They are planted to bring the car to a positive stop through the telescoping of the buffer thus occurring at a carefully calculated rate of speed, which is regulated by the escape of air from the compressed air of the buffer to another. The buffers have been proven capable by test of bringing the elevator safely to rest from full speed, and in this respect are unique among elevator safety features of comparatively low cost.

The firms that install elevators in tall buildings claim that there is practically no chance of an accident. The cars are far from the axis of the governor, consisting of two balls on levers which revolve slowly as the car proceeds up or down.

When the speed of the car exceeds the limit set by the governor balls fly up and the safety chain grasps the cable leading down to the safety appliance. The pull then exerted by the descending car causes heavy clamps to grip the guides at either side of the car and it comes to a standstill. In some instances there is an electrical switch which has stops the car the moment any of the balls enter the elevator shaft area.

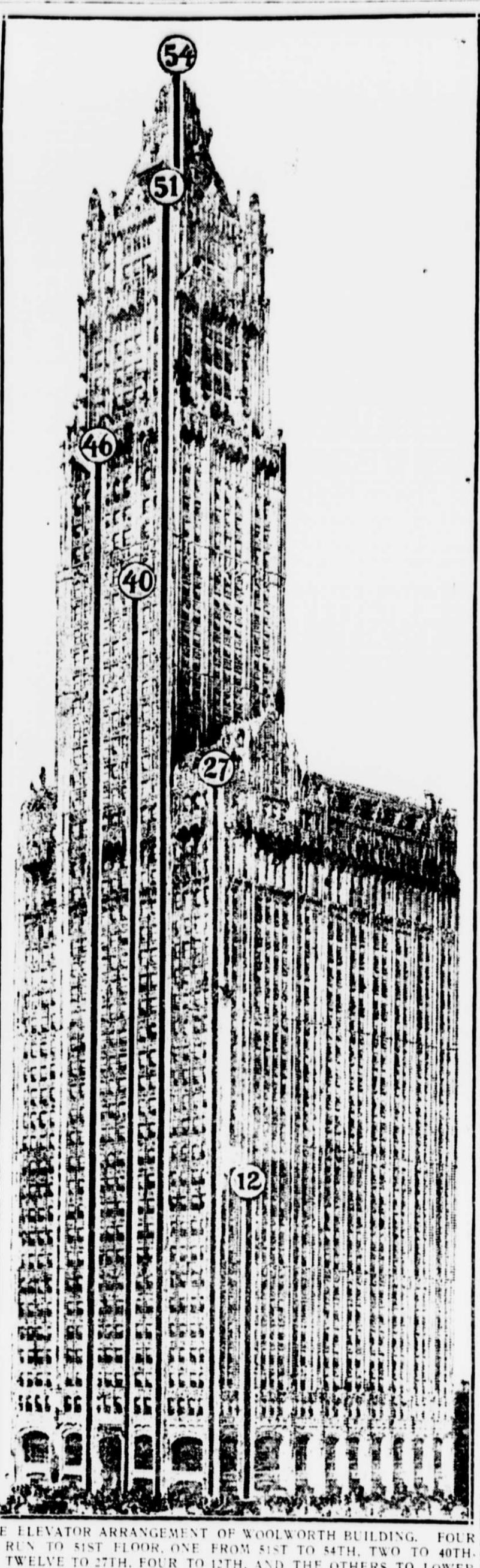
The number of elevators required for a building is determined by the location of the structure and the sort of business that is done there. An office structure in the financial district where people are constantly coming and going make more elevators than a less building, where the demand for service comes mainly at the hour for beginning work and at the hour for quitting.

"We make our elevator cars in whatever shape is required for the building they are to serve," said an officer in an elevator company one day last week. "Some of them in schools and private houses are very elaborate indeed, but in most cases we make them with a strict eye for utility. We used to put mirrors in elevators but we don't now and I tell you why. If you'd promise not to mention my name, it was because women too often forget to call their hair before the mirror. They were too busy fixing their hair before the mirror."

### PROVIDING AGAINST ACCIDENTS.

Safety Devices Required by Law—Some Smaller Towns Tax.

One of the cares of those who plan and equip big buildings is to safeguard future tenants and employees. The window cleaners, the men you see clinging to the windows a score of stories up, come in for a share of the thought of the constructors. Windows, whether on the fourth or the fortieth floor, must be kept clean and to do this somebody



THE ELEVATOR ARRANGEMENT OF WOOLWORTH BUILDING. FOUR RUN TO 51ST FLOOR, ONE FROM 51ST TO 54TH, TWO TO 40TH, TWELVE TO 27TH, FOUR TO 12TH, AND THE OTHERS TO LOWER FLOORS, MAKING A BATTERY OF THIRTY-FOUR MACHINES. THEY ARE OTIS ELEVATORS.

is obliged to get out where the dust has settled on the panes and the rain has cemented it there.

On either side of the window frame the builders put heavy screws with eyes into which a hook can be snipped.

The window cleaner wears a leather belt which fastens to these side pieces giving him support and safeguarding

him from falling. In most of the big buildings it is a standing rule that any window cleaner who does not use the belt and hooks provided for him will be discharged immediately.

"The cleaners get a set used to hanging out even nowhere that they never think of," said W. H. Morewood, who has equipped many of New York's tall buildings with safety devices. "I have often seen them stepping from window to window along a narrow ledge where they could get only the barest foothold and where there was nothing to hold them by themselves by. Sometimes the foolish ones do fall."

There was a remarkable incident at the Mutual Life Building some years ago when a window cleaner slipped off the ledge and was able to grasp a rope hanging from window to story or so below and save his life.

These days there generally is no excuse for accidents of that sort for practically every good-sized building has this safety appliance.

There is sure to be an assembly hall or music room office somewhere in a great building, and care is taken in fitting up this floor or suite on the floor to see that the exits are large enough and that they open outward.

The memory of the Iroquois Theatre fire, of the Collwood school disaster and, more recently, of the Triangle shirtwaist fire, enough to make most builders realize the necessity of putting in doors that will not jam in case of emergency. The doors, therefore, are usually made to open outward and usually have a safety device which releases the door at a slight push.

The great danger in times of panic, as was clearly indicated at the Collwood fire in masses of frightened men, women and children stampeding up the stairs and filling them as long as possible. After the Collwood fire the State of Ohio passed a law requiring not only every school but every public and semi-public building to have doors that open outward. New York City has a similar regulation. In the smaller towns of the country, although some of them have such a law on their books, disregard of this first element of safety is often found, as failing to those who make safety devices their business. The men sent to put in the proposed safety devices frequently report that they are unable to do it because the doors open inward. Then the local mayor will investigate and frequently will find that such an ordinance has already been passed but the school board has forgotten all about it, or the contractor who built the town hall didn't think it made much difference anyway.

## REINFORCED CONCRETE DEMANDS SPECIALISTS

Failures of This Building Method Due to Bad Workmanship, Not Faulty Design.

### EXACTNESS AN ESSENTIAL

Services of an Experienced Engineer Needed to Insure Stability.

The collapsing of a reinforced concrete building in Indianapolis on December 6, killing eight men and injuring twenty-one others, has again brought forward for discussion the cause of failures in construction of reinforced concrete, says "Building Progress."

At the outset we can accept as a premise that it is inexperience and lack of intelligent supervision which is the most prolific cause of failure. This will be better understood by considering the following possibilities of failure from faulty design and faulty construction. Taking up first the possibility of failure from faulty design it can be broadly stated that there is less danger from this source than from faulty construction. There is nothing problematic about the strength of good concrete, or good concrete reinforced with steel, any more than there is about the strength of bricks or stone. The only trouble is, that in designing the architect must assume that the work will be well done, and the reinforcing properly placed, and this only good, intelligent supervision will accomplish. If the work is improperly done, or poor materials lacking in strength are used, either through ignorance or carelessness, the designer's calculations will be brought to nought just the same as if sun-dried bricks were used instead of granite or wooden beams were substituted for steel girders.

Assuming that the materials used will be good, knowing their strength and allowing the usual factors of safety common to architectural and engineering design, there is nothing about the planning of an ordinary building which would overtax the ability of a good reinforced concrete engineer. Even if an error did creep into his calculations, the checking and rechecking which work of this character receives would reveal the defective design, if, indeed, good judgment would not detect the false proportions from previous experience with the same class of work. We may dismiss as improbable, then, the likelihood of faulty design being the cause of reinforced concrete buildings collapsing.

It is in the construction end of the job that the greatest danger lies, and where the greatest care, the utmost experience, the constant vigilance and skilled supervision are needed. Indeed, the very weakness which makes reinforced concrete an unknown quantity is the fact that one poor batch of concrete, or the misplacing of the reinforcing materials, may easily disarrange the integrity of the structure. Unfortunately, this impression has gone abroad that it requires only unskilled labor to erect a reinforced concrete building. Unfortunately, for that is not true; it is only partly true.

It is quite true that ordinary laborers are used in concrete work, while in heavy building high-priced bricklayers would be required. But the real difference comes in when the personnel of the superintendents is considered. The man in charge of a bricklayer crew owes his position to his success in getting work out of his men. That is all that is required of him. Concrete materials are of such a nature that all they require is careful laying to develop their entire strength. Such a foreman would be absolutely worthless in charge of reinforced concrete work; worse than that, he would be absolutely dangerous, for his hasty methods may not be conducive to the best of results, and, unfortunately, when reinforced concrete work is given to the ordinary contractor that is the kind of man usually in charge.

The superintendent in charge of reinforced concrete construction must be more than a labor driver. He must be first and foremost a technical engineer who understands not only cement, concrete, steel and the combination of the three, but likewise possesses a good knowledge of building in general, and has an intimate and firsthand knowledge of the strength of beams, the load walls, doors and columns, will carry, and has a keen perception and sound judgment to guide him in his work.

In short, reinforced concrete work is not common laborers' work, and the sooner that truth is realized the sooner will failures in this class of buildings cease. On the contrary, reinforced concrete is a highly specialized form of building, and requires more than ordinary supervision to carry it successfully through. Instead of giving such work to the ordinary contractor it should be given to specialists only, for there are specialists in reinforced concrete construction in the former, the point to remember, for in the former, construction more than in any other kind of a building, where a specialist is needed. We know this perfectly, for that is part of our line, and we have made it a point to select our superintendents with particular reference to their fitness, their training and further educate them for the work.

Where the great mistake is made in the erecting of buildings of reinforced concrete is in giving the work to an ordinary mason contractor, believing he can do the work satisfactorily because it is mason's materials that are to be used. What the architect seems to fail to understand is that the mason's work is not the same as the engineer's. The engineer's work is designing concrete work, not mason work, that an engineer, not a workman, must have charge of the work if it is to be properly done, for the design and construction go hand in hand. The placing of the reinforcing rods in the walls, floors, columns and beams is even the best work for an engineer, and a superintendent who has not had this training cannot be expected to do it.

In the erecting of steel framework for buildings the beams are all cut and punched at the shops, under direction of the structural engineer, or in accordance with plans prepared by him, and erected according to other drawings. In such a case every beam must be cut to fit. Nothing is left to the judgment of the workmen on the building. That is the exact method of building. In the case of reinforced concrete nothing can be placed there under the careful supervision of the engineer who understands the need of being exact.

There will be fewer reinforced concrete failures in the future if architects will just keep that fact in mind.

The success or failure of their plans and reputations depends more on the people entrusted with their work than on any other means of construction.

To contrast the work of contractors to the mistaken impression that concrete building is rough

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